

Regional Greenhouse Gas Initiative

The World's Carbon Markets: A Case Study Guide to Emissions Trading

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Brief History and Key Dates:

The Regional Greenhouse Gas Initiative (RGGI) is a cooperative effort among nine Northeastern and Mid-Atlantic States to reduce carbon dioxide (CO₂) emissions from the electric power sector through coordinated state cap and trade programs. The implementation of RGGI marks the U.S.'s first mandatory trading program that caps CO₂ emissions.

RGGI developed over several years, starting in late 2003, to address the risks associated with climate change.¹ On December 20 2005, nine RGGI states issued a memorandum of understanding (MOU) that explained the overall goal of RGGI: to create a cap and trade program aimed at stabilizing and reducing emissions within participating states, while remaining consistent with overall economic growth and the maintenance of a safe and reliable electric power supply system.² RGGI started in 2008 with first auctioning of CO₂ allowances, while the first compliance period took effect on January 1 2009.

States have joined and withdrawn from RGGI over the years. Maryland joined RGGI in 2007 after an amendment to RGGI's MOU.³ New Jersey, on the other hand, withdrew from RGGI on May 26 2011.⁴ The following states currently participate in RGGI: Connecticut, Delaware, Massachusetts, Maryland, Maine, New Hampshire, New York, Rhode Island and Vermont.

RGGI is composed of individual, state-level CO₂ cap and trade programs that allow allowance trading between one another. To aid states in establishing similar programs, RGGI states created a Model Rule first published in 2006.⁵ Subsequently, and in accordance with this Model Rule, each state established its own cap and trade program that 1) set limits on in-state CO₂ emissions from electric power plants, 2) issued CO₂ allowances and 3) established state participation in regional CO₂ allowance auctions.⁶

The MOU outlines a comprehensive 2012 review of the RGGI program. The MOU requires that this review address the following issues: the environmental success of RGGI; impact of RGGI on electricity price and system reliability; and, whether to consider any additional reductions. Lastly, the MOU calls for an evaluation of offsets including price, availability and environmental integrity.⁷

RGGI completed its program review with the release of an updated Model Rule on February 7 2013.⁸ Each of the nine RGGI states plans to adopt the amendments contained within the updated Model Rule according to their unique regulatory or legislative procedures, so that the new rules take effect on January 1 2014.⁹ Both the House and Senate

in New Hampshire recently passed a bill, that Governor Maggie Hassan is expected to sign, that approves the amendments contained within the updated Model Rule.¹⁰

Summary of Key Policy Features:

CAP/TARGET: RGGI consists of *three-year compliance periods*, the first of which started on January 1 2009 and ended on December 31 2011. The MOU sets the states’ overall *emissions budget* at 188 million short tons of CO₂ for the first compliance period. For the second compliance period, which started in 2012, the annual emissions budget was adjusted down to 165 million short tons of CO₂ in order to account for New Jersey’s withdrawal from RGGI.¹¹

During the third compliance period, which will start in 2015, the annual emissions budget is currently set to reduce at 2.5 percent annually, for a total reduction of 10 percent by 2018.¹² The updated Model Rule maintains this reduction rate, but would further lower the cap to 91 million short tons of CO₂ in 2014—equal to 2012 emissions levels for the RGGI states¹³ and would extend the annual 2.5% cap decline from 2015-2018 to 2015-2020.¹⁴

The MOU also apportions the overall emissions budget to individual states. Each state’s share remains constant until 2015, when it reduces by 2.5 percent annually for a *total reduction of 10.0 percent by 2018*. The updated Model Rule would maintain this reduction rate. Figure 1 summarizes the allocated budget for each state in 2013.

State	Budget (in short tons)	Budget (as % total)
Connecticut	10,695,036	6.47%
Delaware	7,559,787	4.58%
Maine	5,948,902	3.60%
Maryland	37,503,983	22.70%
Massachusetts	26,660,204	16.14%
New Hampshire	8,620,460	5.22%
New York	64,310,805	38.93%
Rhode Island	2,659,239	1.61%
Vermont	1,225,830	0.74%
TOTAL	<u>165,184,246</u>	<u>100%</u>

Table 1: State CO₂ Emissions Budgets and Share of Regional Cap, 2012-2014

Source: www.rggi.org/design/overview/regulated_sources

The updated Model Rule also includes provisions to adjust the overall emissions budget to account for RGGI allowances that emitters banked during the first and second compliance periods. Soon into the start of RGGI, it became apparent that the number of allowances in the emissions budget was higher than actual emissions. Allowance prices consequently dropped, making it particularly inexpensive to purchase and bank allowances. While the MOU does allow emitters to bank allowances, the extent of allowances banked by emitters—which one analysis estimates is equal to 57 million short tons of CO₂ equivalent—motivated RGGI states to propose additional adjustments to the emissions budget in the updated Model Rule.¹⁵

Specifically, the updated Model Rule lowers each state's emissions budget annually, according to the amount of allowances that states' emitters have banked. The amount that each state's budget is lowered is determined via a three-step process. First, by January 15 2014, RGGI will calculate an adjustment for each state based on the number of allowances banked by its emitters in 2009, 2010 and 2011. This calculation follows the formula below:

$$\text{FCPIABA} = (\text{FCPA}/7) \times \text{RS}\%$$

Where:

- FCPIABA is the state's first compliance period interim adjustment for banked allowances quantity in short tons.
- FCPA is the state's total quantity of allocation year 2009, 2010, and 2011 CO₂ allowances held in its emitters' general and compliance accounts.
- RS% is the state's portion of the overall cap.

Second, RGGI states will calculate an adjustment for each state based on the number of allowances banked in 2012 and 2013. This calculation follows the formula below:

$$\text{SCPIABA} = ((\text{SCPA} - \text{SCPE})/6) \times \text{RS}\%$$

Where:

- SCPIABA is the state's second control period interim adjustment for banked allowances quantity in short tons.
- SCPA is the total quantity of allocation year 2012 and 2013 allowances held in all emitters' general and compliance accounts, as of March 15 2014.
- SCPE is the total quantity of 2012 and 2013 emissions from all emitters in all RGGI states, as of March 15, 2014.
- RS% is the state's portion of the overall cap.

Third, the RGGI states will lower their emissions budgets an amount equal to: (1) the calculated FCPIABA for each year from 2014 through 2020 and (2) the calculated SCPIABA for each year from 2015 to 2020. This adjustment would effectively adjust the overall cap down, over a seven year period, by a number of allowances equaling total banked allowances from the first and second compliance period.¹⁶

Most of the recent RGGI auctions have been undersubscribed; that is, emitters purchased less than 100 percent of the offered allowances. The RGGI states retained these allowances, but do not intend to reoffer unsold allowances with 2012 or 2013 vintages. Instead, states plan to retire, or not reoffer, these allowances at the end of the second control period.¹⁷

A summary of recommendations, issued in conjunction with the updated Model Rule, outlines: (1) the commencement of a program review no later than 2016. One of the goals of this review is the consideration of additional reductions post-2020.¹⁸

SCOPE/COVERAGE: In 2010, emissions from the power sector in RGGI states amounted to 137 million short tons. This is equivalent to **5.5 percent of total US emissions from the power sector**, which equals 2.26 billion metric tons of CO₂.¹⁹ Taken together, the RGGI states accounted for 13.1 percent of U.S. population in 2011.²⁰

RGGI covers CO₂ emissions from fossil fuel-fired power plants located within the RGGI states that meet the **threshold of 25 Megawatts** or greater in size, with the **point of regulation** at the source of electricity generation. During the first compliance period, RGGI regulated 211 emitters. After New Jersey withdrew from RGGI, the number of regulated emitters dropped to 171. Currently, RGGI regulates **168 facilities**.²¹

By March 1 following the end of each three-year compliance period, every covered emitter must surrender a number of allowances equal to the short tons of CO₂ emissions it emitted over that period.²² In the current regulations, a compliance period extends from three to four years if a pre-determined allowance price trigger is reached.

However, the updated Model Rule would replace this provision with interim control periods. Each of the first two years of a three year compliance period constitutes an interim control period. Emitters would have to hold enough allowances to cover 50 percent of their emissions from each interim control period by March 1 of the year following that interim control period. By March 1 following the end of each three-year compliance period, every emitter would have to retire enough allowances to cover its emissions from the third year of its compliance period and any emissions it did not already retire an allowance for from both interim control periods.^{23,24}

The summary of recommendations issued in conjunction with the updated Model Rule expresses RGGI states' commitment to identify a workable policy to address emissions associated with imported electricity—which are currently not covered under the cap.²⁵ In the future, this may lead to an expansion of the scope of RGGI's program to cover emissions associated with electricity imports.

AUCTION OVERVIEW: RGGI, Inc. makes approximately 90 percent of RGGI CO₂ allowances available by coordinating quarterly central auctions on behalf of the RGGI states. **Proceeds from the auctions** are distributed to states, which then determine how to spend them. RGGI is unique in that it is the only cap and trade program that **auctions virtually all allowances**, instead of freely allocating them. States sell the remaining allowances, which are not auctioned off, directly to qualifying affected sources or distribute them through set-aside programs.²⁶

RGGI auctions follow a **single-round, sealed-bid, uniform-price format**, in which each bidder may submit multiple confidential bids for a specific quantity of allowances at a specific price.²⁷ Any entity can participate in the auctions, given they meet qualification requirements—which includes provision of financial security. However, qualified single buyers or group of affiliated buyers are subject to a **purchase limit** of no more than 25 percent of the allowances offered at a single auction.

ALLOWANCE DISTRIBUTION: Each state determines how to allocate allowances—either via **free allocation** or **auctions**—with two restrictions. First, 25 percent of allowances, which in practice equates to 25 percent of auction proceeds, are to be allocated for a consumer benefit or strategic energy purpose, which includes: promotion of energy efficiency; direct mitigation of electricity ratepayer impacts; promotion of renewable or non-carbon-emitting energy technologies; reward or stimulation of investment in the development of innovative carbon emissions abatement technologies with significant carbon reduction potential; and/or funding administration of the RGGI program. As mentioned before, in practice, states auction virtually all allowances. Furthermore, in practice, the majority of proceeds from the sale of allowances are allocated toward consumer benefit or strategic energy purposes. Second, RGGI requires states to recognize that, in order to provide regulatory certainty, their specific rules for allocations should be completed as far in advance of the launch of the program as practicable.²⁸

During the first compliance period, proceeds from auctioned allowances and direct sales equaled roughly USD \$952 million.²⁹ Moreover, states have received, programmed and disbursed virtually all of these proceeds back into the economy in myriad ways including: energy efficiency measures, community-based renewable power projects, assistance to low-income customers to help pay their electricity bills, education and job training programs, and even contributions to a state's general fund.³⁰ Figure 2 provides a summary of how states spent these proceeds.

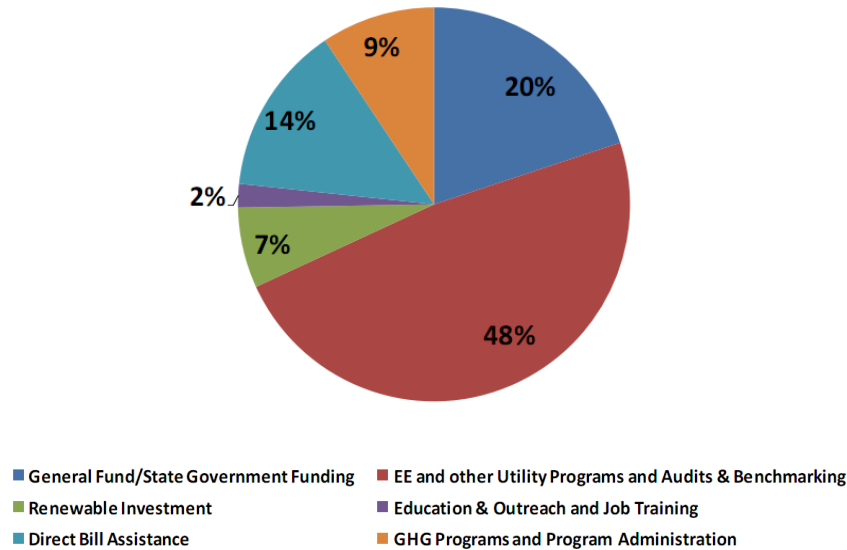


Figure 1: RGGI Proceed Spending from All RGGI States
Source: Analysis Group (2012)³¹

FLEXIBILITY PROVISIONS: The current RGGI rules contain several flexibility provisions including the use of offsets and early reduction credits, banking, compliance periods with flexible durations, and *price collars* (an *auction reserve price* and a unique, complex "*safety valve*" mechanism). The updated Model Rule would modify the way RGGI treats offset usage, remove compliance periods with flexible durations and introduce a Cost Containment Reserve (CCR).

Each RGGI state could grant *early reduction credits* to covered emitters for reductions that are achieved by that emitter during 2006, 2007 and/or 2008. Applications for early reduction credits must have been filed by May 1 2009.

The decision to use three-year *compliance periods*, compared to requiring compliance annually, offers flexibility to covered entities. During the first and second commitment periods, RGGI uses a *trigger price mechanism* that extend that duration of a compliance period. Specifically, after the first 14 months of each compliance period, the duration of a compliance period can be extended by up to three one-year periods if the average price of an allowance exceeds the trigger price for a period of twelve months on a rolling average. The trigger price is USD \$10 (in 2005 USD) as adjusted by the Consumer Price Index (CPI) plus 2 percent annually beginning on January 1 2006.³² However, as mentioned previously, this provision would be eliminated if states approve the updated Model Rule.

RGGI has put in place its own *offset protocols and registry for projects* based within RGGI jurisdictions, unless an MOU is signed with another state. The RGGI program currently allows offsets from the following project types: capture or destruction of CH₄ from landfills; SF₆ reductions from electricity transmission and distribution equipment; CO₂ sequestration through afforestation; CO₂ reductions through non-electric end-use energy efficiency in buildings; and, avoided CH₄ emissions through agricultural manure management operations.³³ On top of these requirements, additional qualifications include:

- Offset projects must consist of actions that are real, additional, verifiable, permanent and enforceable.
- Only reductions that are realized on or after the date of the Memorandum of Understanding (MOU)—December 20 2005—are eligible for compliance.

The updated Model Rule includes the development of a RGGI U.S. Forest Protocol based mainly on the U.S Forests methodology approved by the California Air Resources Board for use in its cap-and-trade program. The protocol covers Improved Forest Management, Avoided Conversion and Reforestation, replacing the existing RGGI Afforestation project category.³⁴

The use of **offsets is limited to 3.3 percent of a covered entity's reported emissions**. RGGI contains geographical restrictions as well; for offsets that originate outside of the RGGI region, the project's state must be entered into an MOU with the RGGI states.

During the first and second control periods, RGGI has provisions whereby if average allowance prices increase over the first 14 months to above USD \$7 or USD \$10, allowance usage increases to 5 and 10 percent, respectively. In addition, at the USD \$10 **price trigger** RGGI can accept **international offset units**, such as Certified Emissions Reductions (CERs).

The updated Model Rule would remove provisions that expand the number of allowable offsets. In place of these provisions, a CCR would be introduced. In 2014, the CCR would contain 5 million allowances, and from 2015 onwards it would contain 10 million allowances. If bids exceed the CCR price trigger at an auction, allowances are made immediately available at or above the CCR trigger price. The CCR price will be USD \$4/ton in 2014, USD \$6/ton in 2015, USD \$8/ton in 2016, USD \$10/ton in 2017, and thereafter rising at 2.5 percent annually.

Each auction has a **reserve price** at which no allowance can be sold under. Currently, the auction reserve price is USD \$1.98 per CO₂ allowance.³⁵ The updated Model Rule would simplify the rate that the reserve price increases by equating that rate to 2.5 percent annually.

The MOU allows for unlimited **banking** of covered facilities' allowances, offset allowances, and early reduction credits for use in future periods.³⁶

MARKET REGULATION AND OVERSIGHT: RGGI's independent market monitor, Potomac Economics, provides monitoring services concerning the competitive performance and efficiency of the RGGI carbon allowance market. Such **monitoring services** include:

- Identifying attempts to exercise market power, collude, or otherwise manipulate prices in the auction and/or the secondary market;
- Making recommendations regarding proposed market rule changes to improve the efficiency of the market for RGGI allowances;
- Assessing whether the auctions are administered in accordance with the noticed auction rules and procedures.³⁷

Emitters are required to **report quarterly CO₂ emissions** to RGGI states through the United States Environmental Protection Agency's (EPA's) Clean Air Markets Division Business System in accordance with RGGI requirements and U.S. EPA regulations at 40 CFR Part 75.³⁸

COMPLEMENTARY POLICIES: As discussed previously, under RGGI, **proceeds from the auctions** are returned to the states and invested in consumer benefit programs such as energy efficiency, renewable energy production, climate change abatement, and direct energy bill assistance. Under the MOU, RGGI states are required to invest a minimum of 25 percent of their auction proceeds for a "consumer benefit or strategic energy purpose." In practice, RGGI participating states are investing more than 60 percent of proceeds to improve end-use energy efficiency and accelerate the deployment of renewable energy technologies.³⁹ Beyond the funding provided by the auction, there are no other regional complementary policies to the cap-and-trade program. However, numerous

participating states have implemented **additional state-specific GHG emissions reduction policies**. For example, each RGGI state has a renewable portfolio standard.

ECONOMIC PROJECTIONS: Based on future projections, if the cap remains unchanged from the initial design, the allowance **price** is not expected to rise above the auction reserve price through 2018. Since the price of allowances is not expected to exceed the auction reserve price, the use of offsets and trading on the secondary market has not materialized at this point.

However, with the release of the updated Model Rule and in anticipation of lower caps, RGGI allowances are now trading at around USD \$3.50, substantially above the auction reserve price. In addition, trading volumes have picked up markedly.⁴⁰

ICF International projects, under the adjusted cap and flexibility provisions proposed in the updated Model Rule, RGGI allowance prices between USD \$3.60 and USD \$10.20 between 2014 and 2020. In ICF's modeling, the CCR releases between 10.0 and 17.6 million short tons worth of allowances into the market between 2014 and 2020.⁴¹

RESULTS: RGGI has achieved the emissions cap established in its 2005 MOU. According to the New York State Energy Research and Development Authority (November, 2010), regarding 2005-2009 emissions reductions,

“The analysis concludes that three categories of factors are the primary drivers of the decreased CO₂ emissions over this period: 1) lower electricity load (due to weather; energy efficiency programs and customer-sited generation; and the economy); 2) fuel-switching from petroleum and coal to natural gas (due to relatively low natural gas prices); and 3) changes in available capacity mix (due to increased nuclear capacity availability and uprates; reduced available coal capacity; increased wind capacity; and increased use of hydro capacity).”⁴²

The New York State Energy Research and Development Authority (NYSERDA) calculated that emissions in the RGGI region declined 33 percent, from 184.4 million short tons in 2005 to 123.7 million short tons in 2009.⁴³ Between 2008 and 2009, emissions specifically from RGGI electric generation sources decreased by 18.4 percent.⁴⁴

Shortly after RGGI began, it became apparent that the program was over-allocated with CO₂ allowances. The history of RGGI auctions reflects this over-allocation. For example, in September 2008, at the first RGGI auction, all 12.56 million allowances offered for sale were sold at a single clearing price USD \$3.07 per allowance.⁴⁵ In contrast, at the September 2011 auction, 18 percent of the 42.19 million allowances offered for sale were purchased at USD \$1.89 per allowance.⁴⁶

On November 15 2011, the Analysis Group published a study on the economic impacts of RGGI's first compliance period, with a particular focus on the impact auction proceeds had on the states' economies. The authors found that:

“RGGI produced \$1.6 billion in net present value economic value added to the ten-state region. The region's economy—and each state's as well—benefits from RGGI program expenditures. When spread across the region's population, these economic impacts amount to nearly \$33 per capita in the region.”⁴⁷

The Analysis Group report categorizes economic impacts of RGGI proceeds into one type of cost and two types of benefits. The author's findings are described below.

- The net cost to power plant owners was USD \$1.6 billion between 2008 and 2011. Most of this loss comes in the long-run, as RGGI-driven energy efficiency leads to lower sales of electricity. While in the short run purchasing

CO2 allowances is indeed an expense, power plants are able to recover their allowance expenditures by increasing electricity prices.

- RGGI funds were used to protect customers from electricity price increases and were invested into energy efficiency. Consumers end up gaining from these investments because their overall electricity bills go down as a result of improvements in energy efficiency. In total, electricity consumers enjoy a net gain of nearly USD \$1.1 billion dollars, as their overall electric bills drop over time.
- The allocation of RGGI proceeds to several types of programs leads to more purchases of goods and services (for example, engineering services for energy audits, energy efficiency equipment, labor for installing solar panels, etc.) that provide an economic stimulus.

Taken together, the **net present value economic benefit** of RGGI's auction proceeds exceeded the cost of RGGI's carbon price. Figure 3, below, summarizes the economic impact of RGGI. In addition, RGGI's first compliance period led to over 16,000 new "job years" and allowed the region to lower dollars sent outside the region in the form of payments for fuel by USD \$756 million dollars.⁴⁸



Figure 2: Net Economic Impact to States in the RGGI Region (2011 USD)

Source: Analysis Group Report (2012)⁴⁹

What Distinguishes this Policy?

UNIQUE ASPECTS:

1. RGGI is one of the only cap and trade systems that **auctions**, instead of freely allocating, the majority of allowances to covered entities.
2. The RGGI program **only impacts emissions in the utility sector**, rather than a multi-sector cap.
3. RGGI is composed of **individual, state-level CO₂ cap and trade programs** that allow allowance trading amongst one another.

CHALLENGES:

1. Participation in the RGGI program is non-binding; so, states have the **option to exit the program**, and the cap is then adjusted to reflect their exit. However, there is also the option for more states to enter the program in the future as well; at least one organization, Environment America, is calling for more states to join RGGI.⁵⁰
2. As discussed earlier, **over-allocation** has resulted because the business-as-usual emissions for covered facilities are below the cap. This is due to both to the macroeconomic slump that has decreased output and

RGGI's success at reducing emissions (both through pricing carbon and investing auction proceeds into energy efficiency and renewable energy). The updated Model Rule, however, may fix this over-allocation issue.

3. If the RGGI cap is lowered, renewed attention may need to be given to the issue of **emissions leakage**. The updated 2012 program review explicitly calls for consideration of emissions leakage.

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Disclaimer: The authors encourage readers to please contact them with any corrections, additions, revisions, or any other comments, including any relevant citations. This will be invaluable in strengthening and updating the case studies and ensuring they are as correct and informative as possible.

¹ See Report "The Economic Impacts of the Regional Greenhouse Gas Initiative on Ten Northeast and Mid-Atlantic States" Published in November 2011 by the Analysis Group. Available here:

http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/Economic_Impact_RGGI_Report.pdf.

² See "Memorandum of Understanding" Published by RGGI in 2005. Available here:

http://rggi.org/docs/mou_12_20_05.pdf.

³ See "Second Amendment to the Memorandum of Understanding" Published by the Regional Greenhouse Gas Initiative in 2007. Available here: http://rggi.org/docs/mou_second_amend.pdf.

⁴ See Article "Gov. Christie Announces N.J. Pulling Out of Regional Environmental Initiative," Published on May 26 2011 by the Start-Ledger. Available here:

http://www.nj.com/politics/index.ssf/2011/05/gov_christie_to_announce_nj_pu.html.

⁵ See "Regional Greenhouse Gas Initiative Model Rule" Published by RGGI in 2006, Corrected in 2007 and Revised in 2008. The 2006 Version is Available Here: <http://www.rrgi.org/docs/Model%20Rule%20Corrected%208.15.06.pdf>.

⁶ See RGGI's Webpage "Program Design". Available here: www.rrgi.org/design.

⁷ Supra Note 2.

⁸ See "Model Rule" Published in 2012 by RGGI. Available here:

http://rggi.org/docs/ProgramReview/FinalProgramReviewMaterials/Model_Rule_FINAL.pdf.

⁹ See Press Release "RGGI States Propose Lowering Regional CO₂ Emissions Cap 45%, Implementing a More Flexible Cost-Control Mechanism" Published by RGGI Inc. on February 7 2013. Available here:

http://www.rrgi.org/docs/PressReleases/PR130207_ModelRule.pdf.

¹⁰ See Issue of "Carbon Market Daily" Published by Thomson Reuters Point Carbon on May 27 2013. Available here but subscription required: http://www.pointcarbon.com/polopoly_fs/1.2390105!CMD20130527.pdf.

¹¹ Supra Note 1.

¹² See RGGI Website "The RGGI CO₂ Cap." Available here: www.rrgi.org/design/overview/cap.

¹³ Supra Note 8; See Section XX-5.1.

¹⁴ RGGI Inc. (February, 2013). "RGGI States Propose Lowering Regional CO₂ Emissions Cap 45%, Implementing a More Flexible Cost-Control Mechanism." Available at

http://www.rrgi.org/docs/PressReleases/PR130207_ModelRule.pdf

¹⁵ See Article "New RGGI Cap Will Reduce Emissions by a Third By 2020" Published by Thomson Reuters Point Carbon on April 11 2013. Available here but subscription required:

<http://www.pointcarbon.com/aboutus/pressroom/pressreleases/1.2270935>.

¹⁶ Supra Note 8; See Section XX-5.3(e)-(i).

¹⁷ See Document “RGGI Program Review: Summary of Recommendations to Accompany Model Rule Amendments” Published by RGGI in 2013. Available here: http://www.rggi.org/docs/ProgramReview/FinalProgramReviewMaterials/Recommendations_Summary.pdf.

¹⁸ See “RGGI 2012 Program Review: Summary of Recommendations to Accompany Model Rule Amendments” Published by RGGI. Available here: http://www.rggi.org/docs/ProgramReview/FinalProgramReviewMaterials/Recommendations_Summary.pdf.

¹⁹ See: (1) “Executive Summary” Published by the U.S. Environmental Protection Agency. Available at <http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2012-ES.pdf>; and, (2) “RGGI Emissions Trends” Published by Environment Northeast in May 2011. Available here: http://www.environment.org/public/resources/pdf/ENE_RGGI_Emissions_Report_110502_FINAL.pdf.

²⁰ Population and GDP statistics; US Census Bureau (estimate, 2011); Bureau of Economic Analysis (2011); IETA Calculations

²¹ See RGGI Website “Regulated Sources.” Available here: http://www.rggi.org/design/overview/regulated_sources .

²² Supra Note 2; See Section XX-1.2.

²³ See “Summary of Preliminary Draft Model Rule Changes” Published by RGGI in 2013. Available here: http://www.rggi.org/docs/ProgramReview/November20/12_11_20_Model%20Rule%20Summary.pdf.

²⁴ Supra Note 8; See Section XX-6.5.

²⁵ Supra Note 18.

²⁶ Supra Note 1.

²⁷ See “Fact Sheet: RGGI CO₂ Allowance Auctions” Published by RGGI. Available here: http://www.rggi.org/docs/RGGI_Auctions_in_Brief.pdf .

²⁸ Supra, Note 2; See Page 6, Section G.

²⁹ RGGI Inc. (December, 2011). “RGGI Auction Sells 27 Million CO₂ Allowances, Proceeds to Benefit Northeast and Mid-Atlantic Regional Economy.” Available at http://www.rggi.org/docs/PR120911_Auction14Results.pdf

³⁰ Supra Note 1.

³¹ Supra Note 1.

³² Supra Note 2 ; See Page 3, Section 2.

³³ Supra, Note 2 ; See Page 4, Section F.

³⁴ See “Regional Greenhouse Gas Initiative Offset Protocol U.S. Forest Projects” Published by RGGI in 2013. Available here: http://www.rggi.org/docs/ProgramReview/FinalProgramReviewMaterials/Forest_Protocol_FINAL.pdf.

³⁵ RGGI Inc. (March, 2013). “First U.S. Carbon Market Begins Sixth Year of CO₂ Auctions.” Available at http://www.rggi.org/docs/Auctions/19/PRO31513_Auction19.pdf

³⁶ Supra Note 8; See Page 6, Section I.

³⁷ See Market Monitor Reports Published by RGGI. Available here: http://www.rggi.org/market/market_monitor.

³⁸ See “Fact Sheet: CO₂ Budget Source (RGGI) Compliance” Published by RGGI. Available here: http://www.rggi.org/docs/RGGI_Compliance_2012_Fact_Sheet.pdf.

³⁹ See “Fact Sheet: Investing in the Clean Energy Economy” Published by RGGI. Available here : http://www.rggi.org/docs/RGGI_Proceeds_in_Brief.pdf.

⁴⁰ See “Carbon Market Daily” Published by Thomson Reuters Point Carbon on May 24 2013. Available here but subscription required: http://www.pointcarbon.com/polopoly_fs/1.2387558!CMNA20130524.pdf.

⁴¹ See “RGGI IPM Analysis: Amended Model Rule” Published by RGGI. Available here: http://www.rggi.org/docs/ProgramReview/February11/13_02_11_IPM.pdf.

⁴² New York State Energy Research and Development Authority (November, 2010). “Relative Effects of Various Factors on RGGI Electricity Sector CO₂ Emissions: 2009 Compared to 2005.” RGGI Inc. Available at http://www.rggi.org/docs/Retrospective_Analysis_Draft_White_Paper.pdf

⁴³ See “Draft for Stakeholder Comment: Relative Effects of Various Factors on RGGI Electricity Sector CO₂ Emissions: 2009 compared to 2005” Published by New York State Energy Research and Development Authority. Available here: http://www.rggi.org/docs/Retrospective_Analysis_Draft_White_Paper.pdf

⁴⁴ Supra Note 1.

⁴⁵ Supra Note 1.

⁴⁶ Supra Note 1.

⁴⁷ Supra Note 1.

⁴⁸ Supra Note 1.

⁴⁹ Supra Note 1.

⁵⁰ See Report “A Double Success: Tackling Global Warming While Growing the Economy with an Improved Regional Greenhouse Gas Initiative” Published by Environment America in Spring 2013. Available here: <http://www.environmentamerica.org/sites/environment/files/reports/A%20Double%20Success%20cover%20vUS%20web.pdf>.